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Litton Systems
MOD007152903
1.5

9-15-93

September 15, 1993

Ms. Anne Olberding
Site Assessment Manager
U.S. Environmental Protection Agency
Region VII Superfund Branch
726 Minnesota Avenue
Kansas City, Kansas 66101

Re: **EPA Contract No. 68-W8-0122**
Final
Draft Site Inspection Prioritization (SIP) Report
for the Litton Systems, Inc.
Advanced Circuitry Division Site
AC 9-29-93
Springfield, Missouri
CERCLIS No. MOD007152903
EPA Work Assignment No. 53-7JZZ
Jacobs Project No. 12-D253-12

Dear Ms. Olberding:

Jacobs Engineering Group Inc. (Jacobs) was tasked by the U.S. Environmental Protection Agency (EPA) to evaluate the Litton Systems, Inc., Advanced Circuitry Division (Litton) site (CERCLIS No. MOD007152903) as a potential candidate for an Expanded Site Inspection (ESI) under the Site Inspection Prioritization (SIP) guidelines. The evaluation included a review of EPA and state file material, and a review of potential contaminant receptor information. The SIP Report is included as an attachment to this letter.

SITE BACKGROUND

The Litton site is located in the northwestern portion of the City of Springfield at 4811 Kearney Street, Greene County, Missouri. The site, which is approximately 50 acres in size, is currently owned by Litton Precision Products, Inc. and Litton Industries, Inc. who purchased the site property in three different parcels between 1963 and 1964 from the Industrial Development Corporation, the City of Springfield, and Mr. and Mrs. Roscoe Prescott. Until the time of purchase, the site property was either vacant or utilized for agricultural purposes. Litton has manufactured printed circuit boards on-site since approximately 1963. The circuit boards were plated with copper, nickel, pyrophosphate, rhodium, gold, and tin. Plating wastewater generated on-site was disposed in various pits, ponds, lagoons, and sinkholes in and around the site property. Estimates of the quantity of plating wastewater generated vary from 200,000 gallons per day (gpd) to 34,000 gpd after waste reduction methods were implemented. In 1982, Litton was connected to the City of Springfield sewer system and ceased on-site disposal of plating wastewater. An estimated total of 193,800,000 gallons of plating wastewater may have been disposed on-site. The site is currently active.

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In 1972, Litton received an operating permit from the Missouri Clean Water Commission. Plating wastewater was originally disposed by irrigation onto a small portion of the site and discharged to an on-site sinkhole. Shortly after the site began operating, storage and settling ponds were constructed for plating wastewater to be discharged through a series of terraces into a pit. The Missouri Department of Natural Resources (MDNR) issued Litton a National Pollutant Discharge Elimination System (NPDES) permit in December 1974. The NPDES permit expired on January 17, 1975 when Litton received the MDNR's approval to construct and operate a new discharge system in which plating wastewater was discharged into a newly constructed lagoon and land-applied to a two-acre portion of the site. After the new discharge system was constructed, use of the storage and settling ponds was discontinued. Accumulated sludges were removed from the ponds and disposed at an approved facility. A sludge pit and an acid disposal pit were also cleaned up in the late 1970s.

The MDNR first conducted an inspection of Litton on September 25, 1979. MDNR discovered that plating wastewater, which was discharged to the lagoon system, was overflowing and releasing wastes into a nearby sinkhole. The following September, the MDNR issued Litton a Consent Order requiring the discharge of plating wastewater to cease. On March 24, 1981 the MDNR conducted a sampling investigation of the Litton site and collected six water samples. Four samples of standing water were collected from three on-site ponds designated as Ponds A, B, and C, and a sanitary lagoon. Two groundwater samples were collected from two monitoring wells located on-site. No information was available in the file material regarding the installation of these monitoring wells. The samples were analyzed for volatile organic compounds (VOC). Several VOCs were detected at high concentrations in all of the samples.

The MDNR conducted another sampling investigation at the Litton site on May 20, 1981 in order to determine the source of the VOCs detected in the March 24, 1981 sampling investigation and to evaluate the effect of the VOCs on local groundwater. Two groundwater samples were collected from the on-site monitoring wells, and ten surface water samples were collected: six from nearby springs; one from the Little Sac River; and three from Ponds A, C, and the sanitary lagoon. The samples collected were analyzed for VOCs. High concentrations of several VOCs were detected in all of the samples except for three spring samples, one of which was collected as a background sample.

On March 26, 1982, the MDNR issued an Emergency Directive to Litton requiring them to cease and correct the imminent hazard caused by the sludges and wastewater in Pond A. Pond A was closed later in 1982. On November 10, 1982 the EPA approved Litton's closure report for Pond A, and Resource Conservation and Recovery Act (RCRA) closure was granted. That same year the accumulated sludges in the lagoon (constructed in 1975) were removed and disposed at an approved facility. The lagoon was dozed in after the sludges were removed. The file material indicated that a pretreatment system was installed around this time which reduced the quantity of plating wastes generated at the site. Litton was connected to the Springfield municipal sewer system in 1982.

The MDNR conducted another sampling investigation of the Litton site on January 27, 1988. Three composite surface soil samples were collected from the site property (one of which was designated as a background sample); one sediment sample and one surface water sample were collected from Ritter Spring west; and three groundwater samples were collected from nearby private wells. All of the samples were analyzed for VOCs and metals. In addition, the water samples were analyzed for base/neutral/acid extractables (BNA). High concentrations of metals were detected in all of the soil samples except for the background sample. The levels of total lead detected in the site soils exceeded the Missouri Department of Health's (MDOH) recommended safe soil level of 238 parts per million (ppm). Two VOCs were also detected at high concentrations in two of the soil samples. Moderate levels of metals were detected in the water samples, and a few VOCs were detected in the water samples at high concentrations. The level of trichloroethylene (TCE) detected in the surface water sample collected from Ritter Spring exceeded the

MDOH's safe drinking water level of 5 µg/L and EPA's drinking water standards maximum contamination level of 0.005 mg/L.

The MDNR completed a Cleanup Assessment for the Litton site on December 14, 1989 based upon the results of the January 27, 1988 sampling investigation. Although the total lead content in the site soils was high, it did not fail the Toxicity Extraction Procedure (TEP) test, and it could not be characterized as a RCRA hazardous waste because it could not be identified as a constituent generated from a listed waste. In addition, the exact source of TCE contamination found in Ritter Spring West is inconclusive because several industries in the area utilize TCE. Therefore, the MDNR determined that conditions at the Litton site did not currently warrant its listing on the Missouri Registry of Confirmed Abandoned or Uncontrolled Hazardous Waste Disposal Sites (The Registry).

Litton hired SCS Engineers to conduct a sampling investigation of the site between January 21 and 26, 1991. SCS Engineers installed seven monitoring wells and collected 14 groundwater samples (seven from the newly installed monitoring wells and seven from pre-existing monitoring wells). No information was available in the file material indicating when the seven pre-existing monitoring wells were installed. Nine surface soil samples were also collected. The samples were analyzed for metals, VOCs, and BNAs. The soil samples contained low concentrations of metals and low concentrations of a few VOCs. The groundwater samples contained low concentrations of metals and high concentrations of various VOCs.

On August 3, 1993, the MDNR and Litton entered into a Consent Agreement with the following stipulations: Litton will investigate, develop, design, and implement a remedial and monitoring program; the MDNR will utilize a site-specific cleanup assessment provided by the MDOH to determine appropriate cleanup levels for the site; and if the remedial actions do not result in a satisfactory cleanup level, the MDNR will pursue listing of the site on The Registry.

GROUNDWATER PATHWAY

The Litton site is located within a four- to five-square mile, internally drained area characterized by karst geology. Nearly all precipitation that falls in the area enters the groundwater system. Numerous groundwater samples have been collected from on-site monitoring wells and nearby private wells. The sample results indicate that groundwater contamination has resulted from waste disposal activities associated with the site. Groundwater usage within a four-mile radius of the site is moderate.

The City of Springfield has three municipal wells, two of which are located within a four-mile radius of the site. All three of these wells are utilized as back-up wells and contribute an average of one percent of the total potable water supply for the City of Springfield. The other 99 percent is supplied by surface water intakes. The total population which receives drinking water from the City of Springfield is approximately 150,000, and an apportioned population of 500 receive drinking water from each of the municipal wells. A review of well logs indicated that a total of 86 private residential wells are located within a four-mile radius of the site, and the estimated population receiving drinking water from these private wells is 209. The estimated total population utilizing groundwater within four miles of the site is 1,709.

SURFACE WATER PATHWAY

Numerous surface water samples have been collected from standing water in pits, ponds, and lagoons on-site as well as from nearby surface water bodies. The sample results indicate that standing water on-site is contaminated, and some of the nearby surface water bodies contained similar contaminants; however, given the distance from the site to the nearest surface water, it is difficult to determine if off-site surface

water contamination is attributable to the Litton site. The nearest surface water body is the Little Sac River which is three miles north of the site.

There is no overland flow pathway from the site to surface water; however, wastewater disposed at the site and precipitation that falls in the area of the site enters sinkholes or percolates into the ground. The majority of the water is funneled to four spring outlets approximately three miles north of the site. These springs include Ritter Spring West, Williams Spring, Fantastic Caverns Spring, and Bunge Spring. All of these springs feed the nearby Little Sac River. The Little Sac River flows northwesterly from the springs for more than 15 miles. The City of Springfield receives 99 percent of its municipal water supply from four surface water intakes. One intake is located on the James River near Pearson Creek, one intake is located on McDaniel Lake near the dam, a third intake is located at Fulbright Spring, and one intake is located on Fellows Lake near the dam. There are no surface water intakes within 15 miles downstream of the point where the site's four spring outlets enter the Little Sac River. The Little Sac River supports many species of fish. Aquatic sensitive environments are also known to exist in the area of the site including the Ozark cavefish (Amblyopsis rosae) and the Missouri bladderpod (Lesquerella filiformis) which are both listed as federally threatened and state endangered species.

SOIL EXPOSURE PATHWAY

Extensive soil sampling has been conducted at the site. The sample results indicate that soil contamination has resulted from waste disposal activities at the site. The site is located in an industrial area on the outskirts of the City of Springfield. Although the area is primarily industrial, pasture lands as well as residential properties also exist in the vicinity of the site. There are no residences, schools, or day-care centers within 200 feet of the site, and the nearest resident is located approximately 1,500 feet south of the site. The approximate population within one mile of the site is 126.

AIR PATHWAY

Air sampling has not been performed at the site; however, a release of site contaminants into the air is not expected due to the nature of the wastes. The total population within a four-mile radius of the site is approximately 24,012. The Black-tailed jackrabbit (Lepus californicus), a state endangered and federally threatened species, is known to live in the vicinity of the site.

CONCLUSIONS

Sampling activities conducted at the site indicate that on-site soils and groundwater have become contaminated as a result of waste disposal activities at the facility. Since the nearest surface water is three miles from the site and several industrial facilities are located in the area, it will be difficult to determine if off-site surface water contamination is attributable to the site even if additional surface water samples are collected. Although air samples have not been collected at the site, air contamination is not expected to result from the site because of the nature of the waste sources. It is anticipated that additional site characterization activities would not affect the existing site assessment results because the Litton site has already been extensively investigated. The Litton Systems, Inc., Advanced Circuitry Division site has recently entered into a Consent Agreement with the MDNR which requires Litton to remediate the site to cleanup levels specified by MDNR.

If you have any questions regarding this report, please contact either of the undersigned at (913) 492-9218 for further clarification and/or discussion.

Sincerely,

Carolyn McManigal

Carolyn McManigal
ARCS Site Manager

Fred D. Reynolds, P.E.
ARCS Program Manager

Attachments: SIP Report

cc: Pete Culver

FIGURES

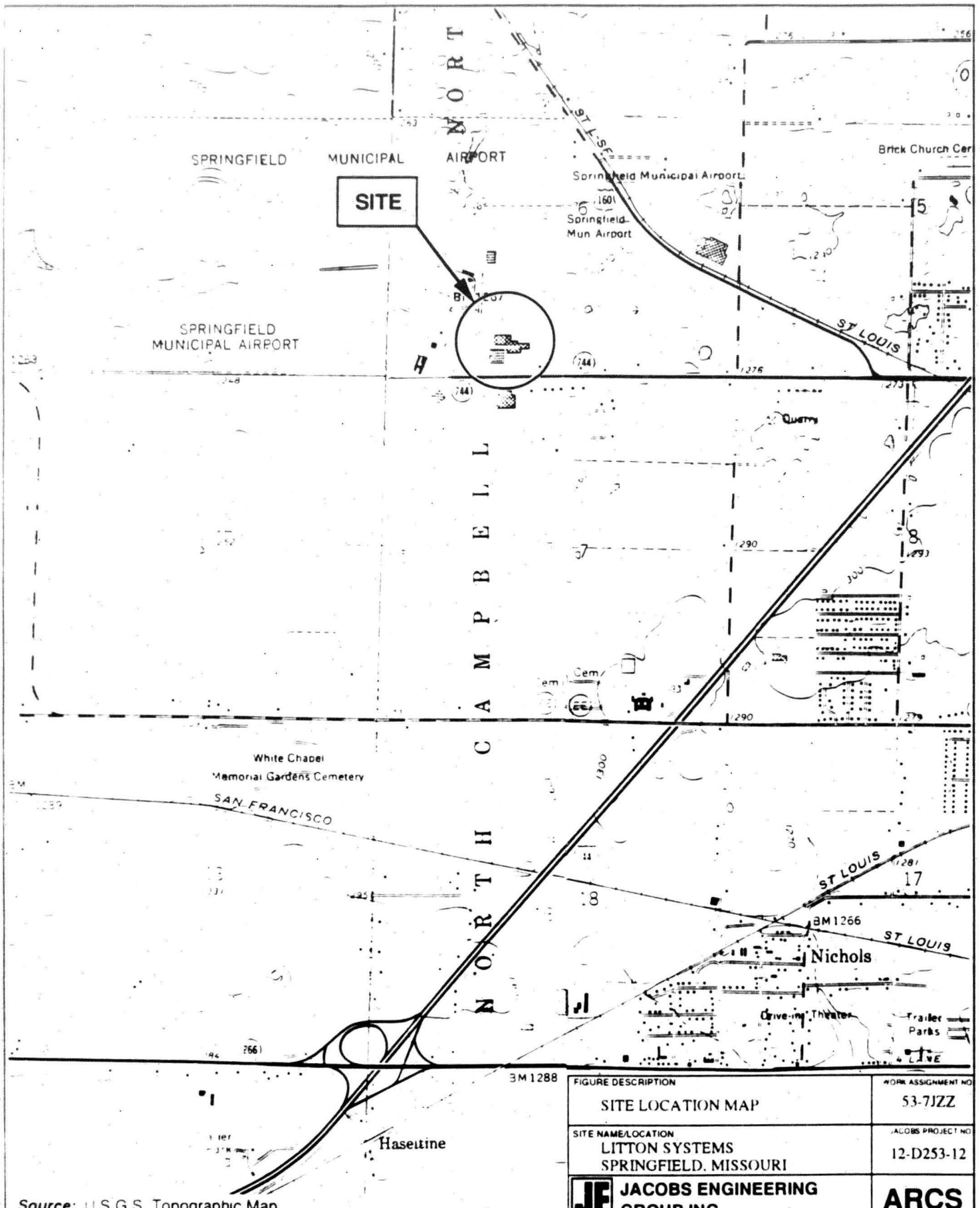


FIGURE DESCRIPTION: SITE LOCATION MAP	WORK ASSIGNMENT NO: 53-7JZZ
SITE NAME/LOCATION: LITTON SYSTEMS SPRINGFIELD, MISSOURI	JACOBS PROJECT NO: 12-D253-12
JACOBS ENGINEERING GROUP INC.	ARCS
DRAWN BY: DJK DATE: 04/12/93	FIGURE NO: 1
CHECKED BY: JL DATE: 04/12/93	

253 12.002

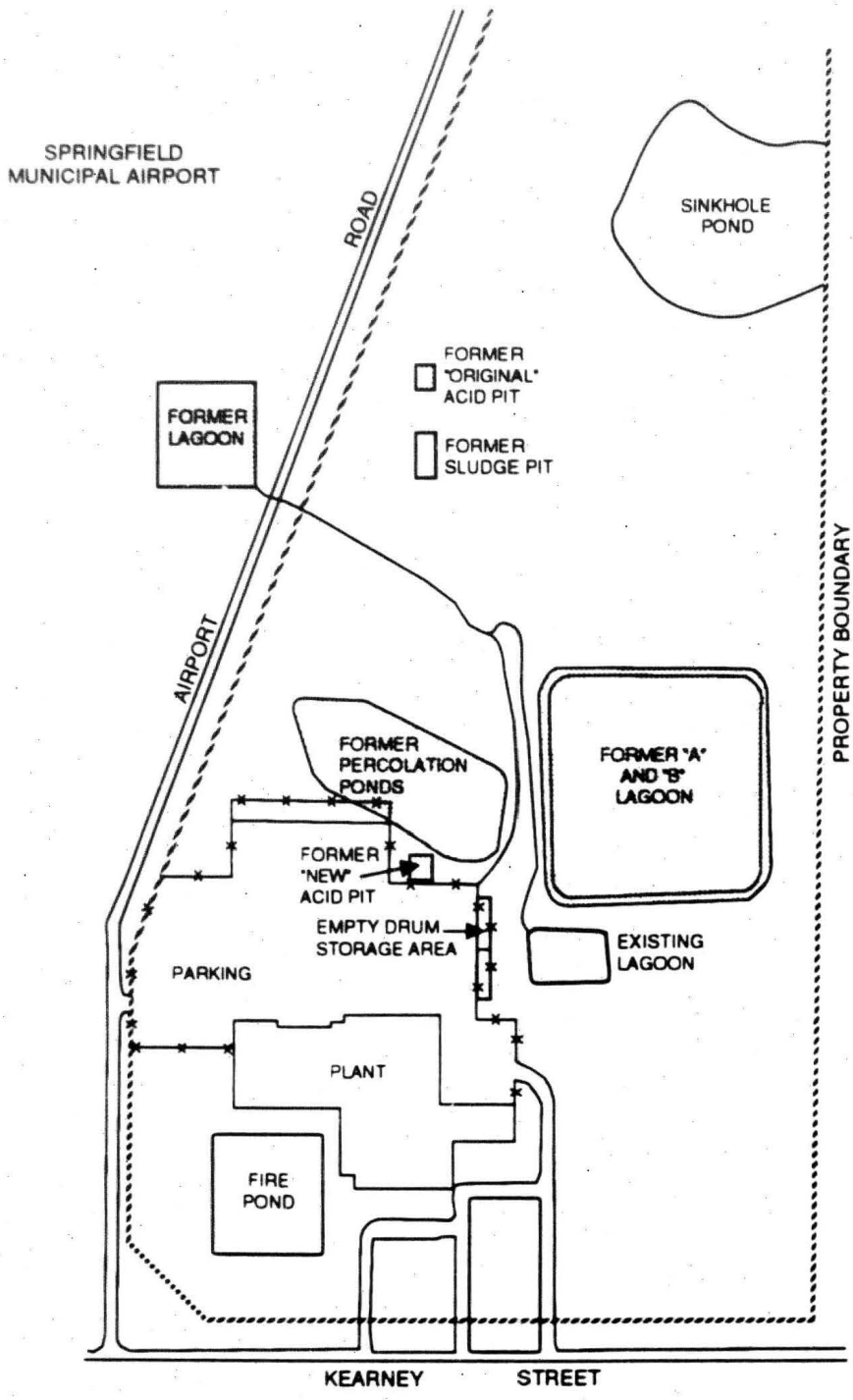


FIGURE DESCRIPTION: SITE MAP	WORK ASSIGNMENT NO: 53-7JZZ
SITE NAME/LOCATION: LITTON SYSTEMS, SPRINGFIELD, MISSOURI	JACOBS PROJECT NO: 12-D253-12
JACOBS ENGINEERING GROUP INC.	ARCS
DRAWN BY: MD DATE: 03/23/93	FIGURE NO: 2
CHECKED BY: KS DATE: 03/23/93	

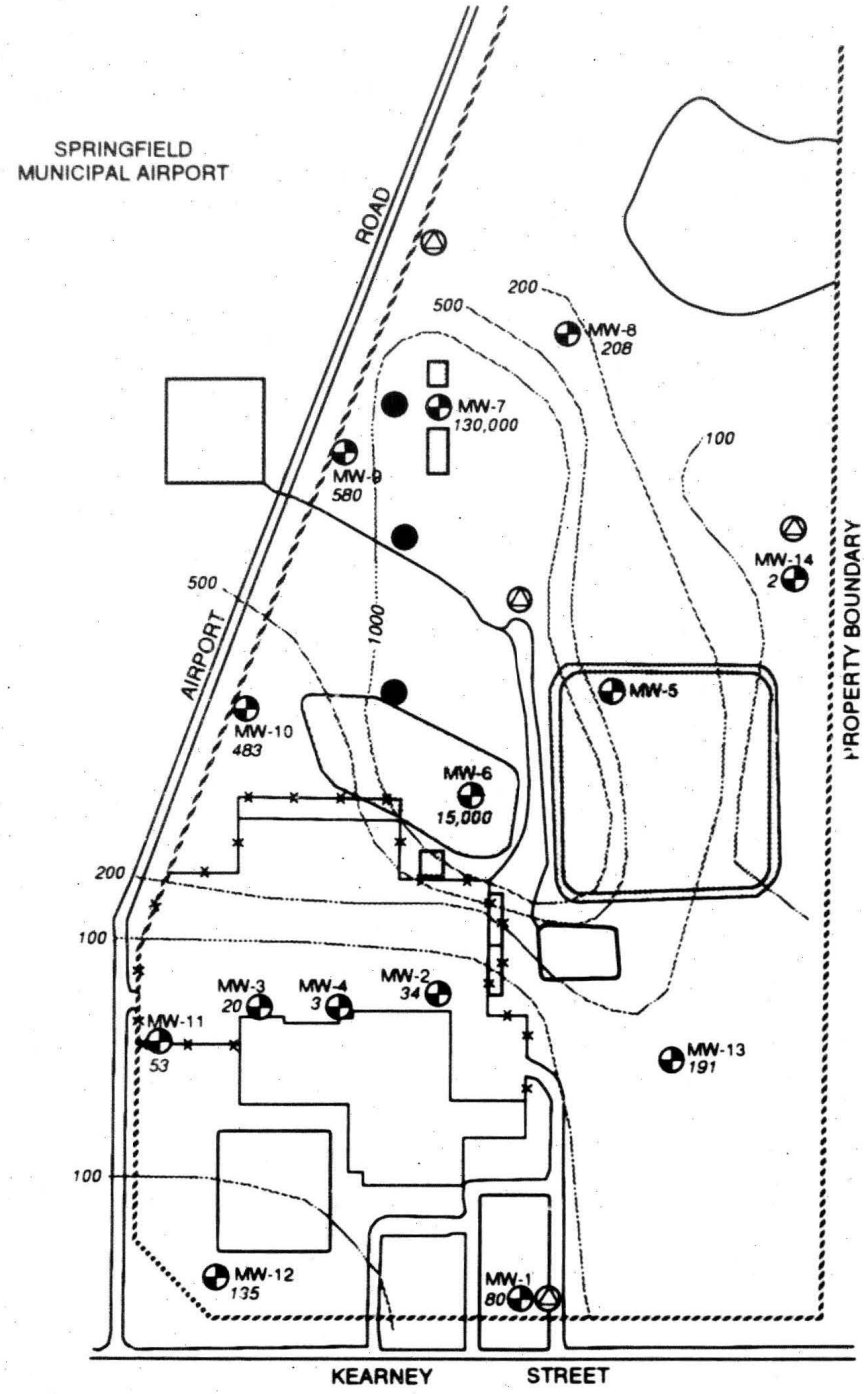
N

0 100

Approximate Scale in Feet

SOURCE: SCS ENGINEERS

D253-12-001



LEGEND

100 ····· TCE ISOCHEMICAL CONTOUR IN µg/l

MW-1 580 MONITOR WELL LOCATION NUMBER, AND TCE CONCENTRATION

PROPOSED RECOVERY WELL

PROPOSED DEEP WELL

0 100

Approximate Scale in Feet

SOURCE: SCS ENGINEERS

FIGURE DESCRIPTION: PROPOSED RECOVERY AND DEEP MONITORING WELL LOCATIONS	WORK ASSIGNMENT NO. 53-7JZZ
SITE NAME/LOCATION LITTON SYSTEMS SPRINGFIELD, MISSOURI	JACOBS PROJECT NO. 12-D253-12
JACOBS ENGINEERING GROUP INC.	ARCS
DRAWN BY MD DATE 03/23/93	FIGURE NO. 3
CHECKED BY KS DATE 03/23/93	

D253-12-001

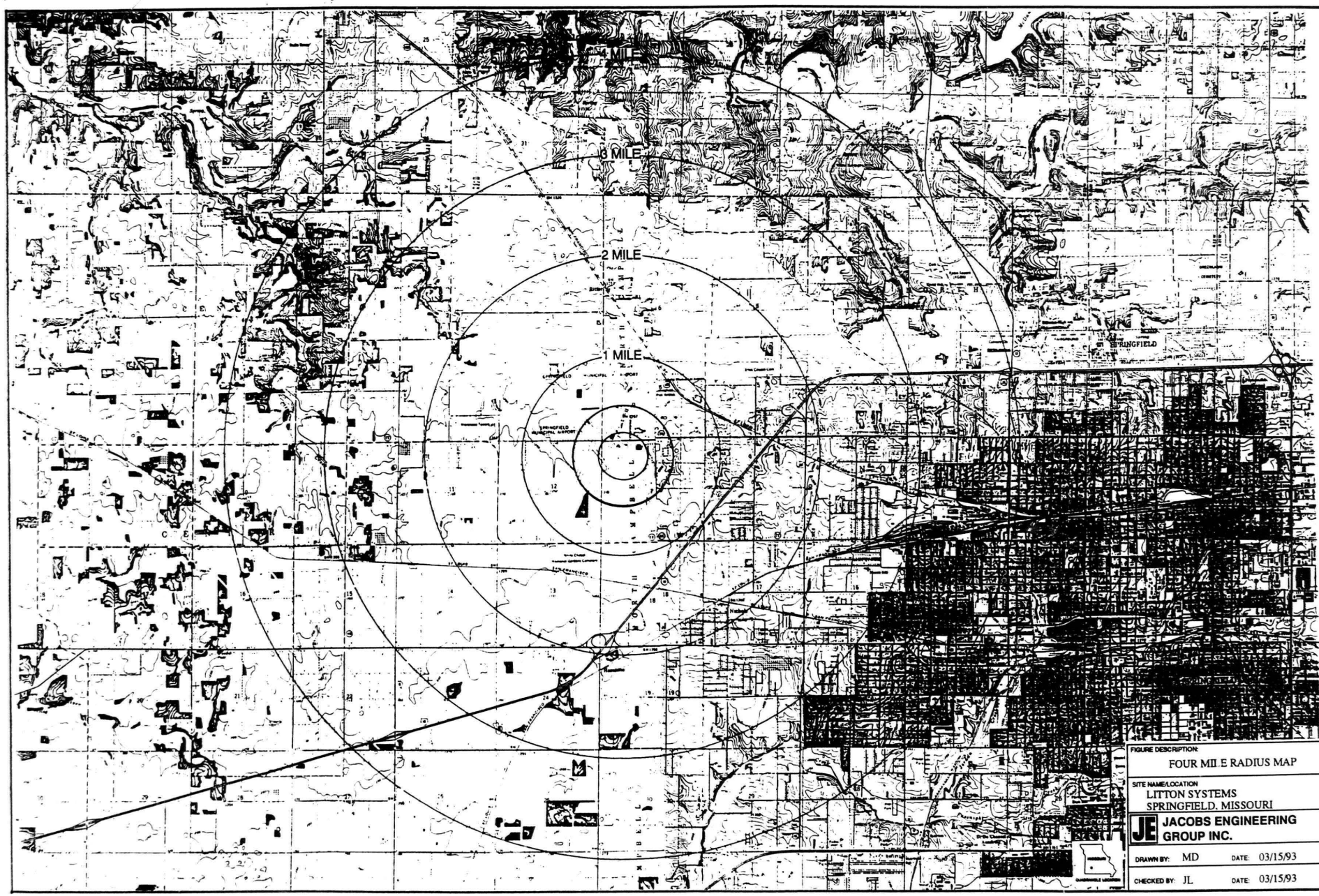


FIGURE DESCRIPTION: FOUR MILE RADIUS MAP	WORK ASSIGNMENT NO: 53-7JZZ
SITE NAME/LOCATION: LITTON SYSTEMS, SPRINGFIELD, MISSOURI	JACOBS PROJECT NO: 12-D253-12
JACOBS ENGINEERING GROUP INC.	ARCS
DRAWN BY: MD DATE: 03/15/93	FIGURE NO: 4
CHECKED BY: JL DATE: 03/15/93	

TABLES

TABLE 1
Litton Systems, Inc., Advanced Circuitry Division
Springfield, Missouri
CERCLIS No: MOD007152903
Sample Analysis Results of Groundwater and Surface Water Samples Collected by MDNR
March 24, 1981

	Sample Numbers					
Contaminant	81-9619	81-9620	81-9621	81-9622	81-9623	81-9624
Vinyl chloride	132	340	ND	ND	ND	ND
1,1-Dichloroethylene	8.1	11	ND	ND	ND	ND
1,1-Dichloroethane	176	181	ND	ND	ND	ND
trans-1,2-Dichloroethylene	335	250	ND	ND	ND	17
1,1,1-Trichloroethane	63	58	78	ND	ND	ND
1,2-Dichloropropane	79	54	80	236	392	2.4
Trichloroethylene	17	42	29	17	72	131
Methylene chloride	ND	ND	325	1,008	1,010	174
1,1,2-Trichloro-1,1,2-trifluoroethane	ND	ND	D	D	ND	ND
Chloromethane	ND	ND	ND	9.6	ND	ND

NOTE: All concentrations reported in µg/l.
ND The material was analyzed for, but was not detected.
D Compound was qualitatively identified; however, the quantitative value is less than the sample quantitation limit.

TABLE 2
Litton Systems, Inc., Advanced Circuitry Division
Springfield, Missouri
CERCLIS No. MOD007152903
Selected Sample Analysis Results of Groundwater and Surface Water Samples Collected by MDNR
May 20, 1981

	Sample Numbers								
Contaminant	81-6230	81-6231	81-6232	81-6233	81-6234	81-6235	81-6236	81-6237	81-9638
Trichloroethylene	200	7	4.9	20.8	233	ND	ND	106	30
1,2-Dichloropropane	11.4	ND	ND	ND	ND	4.1	4.3	119	105
1,1,1-Trichloroethane	12.6	ND	ND	3.7	ND	ND	3.2	67.9	47.2
trans-1,2-Dichloroethylene	27.8	ND	ND	ND	27.5	ND	ND	260	256
Chloroform	ND	ND	ND	ND	ND	ND	4.2	ND	ND
Bromodichloromethane	ND	ND	4.4	ND	ND	ND	ND	ND	ND
Dibromochloromethane	ND	ND	7.1	ND	ND	ND	ND	ND	ND
Vinyl chloride	ND	ND	ND	ND	ND	ND	ND	59.4	58.3
1,1-Dichloroethylene	ND	ND	ND	ND	ND	ND	ND	14.3	12.5
1,1-Dichloroethane	ND	ND	ND	ND	ND	ND	ND	112	132
1-Butene	ND	ND	ND	ND	ND	ND	15	ND	ND
Thiobismethane	ND	ND	ND	ND	ND	ND	45	ND	ND
2-Propane	ND	ND	ND	ND	ND	ND	75	ND	ND
Carbon disulfide	ND	ND	ND	ND	ND	ND	35	ND	ND
Tetrahydrofuran	ND	ND	ND	ND	ND	ND	16	ND	ND
1-Butanol	ND	ND	ND	ND	ND	ND	300	ND	ND

NOTE: All concentrations reported in µg/l.
ND The material was analyzed for, but was not detected.

TABLE 3
Litton Systems, Inc., Advanced Circuitry Division
Springfield, Missouri
CERCLIS No. MOD007152903
Selected Sample Analysis Results of Groundwater, Surface Water, Sediment, and Surface Soil Samples Collected by MDNR
January 27, 1988

	Sample Numbers							
Contaminant	88-0186 µg/L	88-0187 µg/kg	88-0196 µg/L	88-0198 µg/kg	88-0220 µg/kg	88-0221 µg/kg	88-0222 µg/L	88-0223 µg/L
(T)Silver	ND	600	ND	1,000	400	200	ND	ND
(T)Arsenic	ND	11,000	ND	33,000	3,800	3,200	ND	ND
(T)Barium	87	150,000	51	210,000	180,000	150,000	63	ND
(T)Cadmium	ND	1,200	ND	400	400	400	ND	ND
(T)Chromium	ND	39,000	ND	390,000	31,000	12,000	ND	ND
(T)Copper	40	620,000	40	4,500,000	580,000	7,200	40	30
(T)Mercury	ND	220	ND	400	220	220	ND	ND
(T)Nickel	80	190,000	ND	61,000	37,000	21,000	ND	ND
(T)Lead	ND	ND	ND	290,000	41,000	25,000	ND	ND
(T)Selenium	ND	ND	ND	260	420	ND	ND	ND
(TEP)Copper	ND	90	ND	140	50	ND	ND	ND
(TEP)Nickel	ND	640	ND	70	60	30	ND	ND
1,1,1-Trichloroethane	ND	ND	ND	1,500	ND	ND	ND	ND
Trichloroethylene	68	ND	ND	29,000	2,200	ND	44	ND
Methylene chloride	ND	ND	24	ND	ND	ND	ND	ND
Carbon disulfide	ND	ND	ND	ND	ND	ND	ND	7.7
1,2-Dichloroethylene	14	ND	ND	ND	ND	ND	ND	ND

T Total metals.
ND The material was analyzed for, but was not detected.
TEP Toxicity Extraction Procedure Metals.

TABLE 4
Litton Systems, Inc., Advanced Circuitry Division
Springfield, Missouri
CERCLIS No. MOD007152903
Selected Sample Analysis Results of Soil Samples Collected by SCS Engineers
January 1991

	Sample Numbers								
Contaminant	**B-B1-5.5**	**B-B1-10**	**B-B2-6**	**B-B3-5**	**B-B3-10**	**B-B3-15**	**B-B4-5**	**B-B4-7**	**B-B4-10**
Copper	10	12	830	5	6	9	47	9	25
Nickel	38	27	36	ND	12	11	13	ND	25
Zinc	50	56	61	20	29	39	24	20	50
1,2-Dichloropropane	14	ND	ND	ND	16	21	ND	B	ND
Trichloroethene	260	130	41	ND	11	13	ND	B	480
Ethanol	ND	ND	12	ND	73	200	ND	B	ND

NOTE: All copper, nickel, and zinc concentrations reported in mg/kg. All 1,2-dichloropropane, trichloroethene, and ethanol concentrations reported in µg/kg.
ND The material was analyzed for, but was not detected.
B The sample container broke before the analysis could be performed.

TABLE 5
Litton Systems, Inc., Advanced Circuitry Division
Springfield, Missouri
CERCLIS No. MOD007152903
Selected Sample Analysis Results of Groundwater Samples Collected by SCS Engineers
January 1991

	Sample Numbers													
Contaminant	**MW1**	**MW2**	**MW3**	**MW4**	**MW5**	**MW6**	**MW7**	**MW8**	**MW9**	**MW10**	**MW11**	**MW12**	**MW13**	**MW14**
Copper	ND	ND	691	7.8	0.2	0.4	5.4	ND	ND	ND	ND	ND	ND	ND
Nickel	ND	ND	0.6	ND	0.5	0.5	0.8	ND	ND	ND	ND	ND	ND	ND
Zinc	ND	ND	5.4	ND	ND	0.1	0.1	ND	ND	ND	ND	ND	ND	ND
Cyanide	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.3	ND	ND	ND	ND
1,2-Dichloropropane	23	22	15	9	135	1,500	ND	ND	ND	172	40	50	50	ND
Trichloroethylene	80	34	20	3	490	15,000	130,000	208	580	483	53	135	191	2
Chloroform	ND	10	ND	ND	ND	8	ND	ND	ND	ND	ND	ND	ND	ND
trans-1,2-Dichloroethylene	ND	ND	70	ND	ND	15	ND	ND	ND	ND	ND	ND	ND	ND
Methylene chloride	ND	ND	5,000	ND	ND	90	73,000	ND	ND	ND	ND	ND	ND	ND
1,1,1-Trichloroethane	ND	ND	20	ND	400	12,000	1,000	76	197	53	14	ND	17	ND
1,1-Dichloroethane	ND	ND	ND	ND	60	32	910	ND	12	ND	28	ND	17	ND
1,1-Dichloroethylene	ND	ND	ND	ND	134	1,200	29,300	ND	250	ND	10	ND	ND	ND
Tetrachloroethylene	ND	ND	ND	ND	ND	10	2,500	5	7	18	ND	ND	ND	ND
1,1,2-Trichloroethane	ND	ND	ND	ND	ND	43	ND	ND	ND	ND	ND	ND	ND	ND
Bromodichloromethane	ND	ND	ND	ND	ND	ND	30	ND	ND	ND	ND	ND	ND	ND
Carbon tetrachloride	ND	ND	ND	ND	ND	ND	100	ND	ND	ND	ND	ND	ND	ND
1,2-Dichloroethane	ND	ND	ND	ND	ND	ND	480	ND	ND	ND	ND	ND	ND	ND

NOTE: All copper, nickel, zinc, and cyanide concentrations reported in mg/l. All other contaminant concentrations reported in µg/l.
ND The material was analyzed for, but was not detected.